

That which is claimed is:

1. A novel receptor protein characterized by having the following domains, reading from the N-terminal end of said protein:

5                   an extracellular, ligand-binding domain,  
                  a hydrophobic, trans-membrane domain, and  
                  an intracellular, receptor domain having serine kinase-like activity.

10                 2. A protein according to Claim 1, further comprising a second hydrophobic domain at the amino terminus thereof.

15                 3. A protein according to Claim 1, wherein said protein is further characterized by having sufficient binding affinity for at least one member of the activin/TGF- $\beta$  superfamily of polypeptide growth factors such that concentrations of  $\leq 10$  nM of said polypeptide growth factor occupy  $\geq 50\%$  of the binding sites of said receptor protein.

20                 4. A protein according to Claim 3, wherein said protein is further characterized by:

                  having a greater binding affinity for activins than for inhibins,

25                 having substantially no binding affinity for transforming growth factors- $\beta$ , and

                  having substantially no binding affinity for non-activin-like proteins.

30                 5. A protein according to Claim 1 having an amino acid sequence substantially the same as set forth in Sequence ID No. 2, Sequence ID No. 2', Sequence ID No. 4, or Sequence ID No. 12.

6. A soluble, extracellular, ligand-binding protein, further characterized by:

having a sufficient binding affinity for at least one member of the activin/TGF- $\beta$  superfamily of polypeptide 5 growth factors such that concentrations of  $\leq$  10 nM of said polypeptide growth factor occupy  $\geq$  50% of the binding sites on said receptor protein, and

having at least about 30% sequence identity with respect to:

10 the sequence of amino acids 20-134 set forth in Sequence ID No. 2;

the sequence of amino acids 20-134 set forth in Sequence ID No. 2, wherein the arginine residue at position number 39 is replaced by a lysine, and the 15 isoleucine at residue number 92 is replaced by a valine;

the sequence of amino acids 21-132 set forth in Sequence ID No. 4; or

20 the sequence of amino acids 26-113 set forth in Sequence ID No. 12.

7. A protein according to Claim 6, further characterized by:

having a greater binding affinity for activins than 25 for inhibins,

having substantially no binding affinity for transforming growth factors- $\beta$ , and

having substantially no binding affinity for non-activin-like proteins.

30 8. A protein according to Claim 6 wherein said protein comprises in the range of about 88-118 amino acids.

9. A method for the recombinant production of 35 activin receptor(s), said method comprising

expressing the DNA encoding a protein according to Claim 1, in a suitable host cell.

10. A method for the recombinant production of soluble activin receptor(s), said method comprising expressing the DNA encoding a protein according to Claim 6, in a suitable host cell.

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11. A method for screening a collection of compounds to determine those compounds which bind to receptors of the activin/TGF- $\beta$  superfamily, said method comprising employing the receptor of claim 1 in a 10 competitive binding assay.

12. A bioassay for evaluating whether compounds are agonists for receptor protein(s) according to Claim 1, or functional modified forms of said receptor protein(s), 15 said bioassay comprising:

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(a) culturing cells containing:

DNA which expresses said receptor protein(s) or functional modified forms of said receptor protein(s), and

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DNA encoding a hormone response element operatively linked to a reporter gene, wherein said culturing is carried out in the presence of at least one compound whose ability to induce transcription activation activity of said receptor protein is sought to be determined; and thereafter

(b) monitoring said cells for expression of said reporter gene.

13. A bioassay for evaluating whether compounds are antagonists for receptor protein(s) according to Claim 1, or functional modified forms of said receptor protein(s), said bioassay comprising:

5 (a) culturing cells containing:

DNA which expresses said receptor protein(s), or functional modified forms of said receptor protein(s), and

10 DNA encoding a hormone response element operatively linked to a reporter gene; wherein said culturing is carried out in the presence of:

15 increasing concentrations of at least one compound whose ability to inhibit transcription activation of said receptor protein(s) is sought to be determined, and

20 a fixed concentration of at least one agonist for said receptor protein(s), or functional modified forms of said receptor protein(s); and thereafter

25 (b) monitoring in said cells the level of expression of the product of said reporter gene as a function of the concentration of said compound, thereby indicating the ability of said compound to inhibit activation of transcription.

14. An antibody generated against the protein of  
Claim 1.

30 15. An antibody according to Claim 14, wherein said antibody is a monoclonal antibody.

16. An antibody generated against the protein of  
Claim 6.

35 17. An antibody according to Claim 16, wherein said antibody is a monoclonal antibody.